



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/815,563

03/31/2004

Adrian P. Stephens

884.B93US1

7133

21186

7590

10/10/2008

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

P.O. BOX 2938

MINNEAPOLIS, MN 55402

EXAMINER

DUONG, CHRISTINE T

ART UNIT

PAPER NUMBER

2416

MAIL DATE

DELIVERY MODE

10/10/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/815,563	<b>Applicant(s)</b> STEPHENS ET AL.	
	<b>Examiner</b> CHRISTINE DUONG	<b>Art Unit</b> 2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,9-11,18-20,23,26-28,31-33,37 and 40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,9-11,18-20,23,26-28,31-33,37 and 40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The references listed in the Information Disclosure Statement, filed on 26 June 2008, have been considered by the examiner (see attached PTO-1449 form or PTO/SB/08A and 08B forms).

### ***Claim Rejections - 35 USC § 103***

1. Claims 1, 9-11, 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Myles et al. (PG Pub US 2004/0008661 A1 hereafter Myles) further in view of Yonge, III et al. (PG Pub US 2005/0114489 A1 hereafter Yonge) and Chapman (PG Pub US 2005/0058159 A1 hereafter Chapman).

Regarding claim 1, Myles discloses an apparatus (figs. 3-8).

The limitation, receiving an application-layer packet from a source application ("receives data 324 from a data link (or higher) level interface of the wireless station" [0048] lines 8-10), wherein the application-layer packet includes the source application-layer timestamp (TSFlocalout, fig. 4b) and the source data (data, fig. 4b).

The limitation, generating a source MAC-layer timestamp in response to receiving the application-layer packet ("TSFbeacon out denotes the timestamp value that is inserted into an outgoing beacon MPDU for transmission" [0062]).

The limitation, the source MAC-layer timestamp is generated when the application-layer packet enters a medium access control layer of the source device ("The MAC transmit HW 316 causes the beacon denoted Beacon(TSFbeaconout) with this timestamp TSFbeaconout to be transmitted by the PHY" [0085]).

Art Unit: 2416

The limitation, producing a medium access control (MAC) packet that includes the source application-layer timestamp (TSFlocalout, fig. 4b), the source data (data, fig. 4b), and the source MAC-layer timestamp (TSFbeaconout, fig. 4b), wherein the source MAC-layer timestamp is based on a substantially synchronized clock between the source device and a destination device ("Synchronization between TSFs in STAs and APs is achieved using time synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp" [0036] lines 5-8), and the source MAC-layer timestamp indicates a time when the source data is provided for transmission across a portion of a system that is subject to variable delays ("The MAC transmit HW 316 causes the beacon denoted Beacon(TSFbeaconout) with this timestamp TSFbeaconout to be transmitted by the PHY" [0085]).

The limitation, establishing a fixed transport delay value (Toffsetin or Toffsetout) for the destination device to use to schedule delivery of the source data to a destination application (table 1 or table 2).

However, Myles fails to specifically disclose a source application-layer timestamp and the source MAC-layer timestamp is based on a substantially synchronized clock between a source device and a destination device and determining a longest observed delay between the source device and the destination device to determine the fixed transport delay value.

Nevertheless, Yonge teaches "The MSDU format 100 also provides support for the layer of the network architecture 50 that is higher than the MAC layer 54 to control

Art Unit: 2416

when a delivery time stamp has to be inserted" (Yonge [0059]) and "The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the transmitter MAC 12, thus enabling jitter free service" (Yonge [0091] lines 9-13).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have a source application-layer timestamp and the source MAC-layer timestamp be based on a substantially synchronized clock between a source device and a destination device because it will "provide support to enhance Quality of Service (QoS) support and efficient delivery of management information" (Yonge [0009] lines 4-6).

In addition, Myles and Yong discloses everything claimed as applied above. However, Myles and Yong fails to specifically disclose the limitation, determining a longest observed delay between the source device and the destination device to determine the fixed transport delay value.

Nevertheless, Chapman teaches "the master timestamp counter 44A in the master TSC 18A has a particular timestamp value at pulse 50 of synchronization pulses 14. In this example, the timestamp counter value is thirty. At a next pulse 52, the value of master timestamp counter 44A is thirty five. The processor 40A in master TSC 18A calculates the period T between pulses 50 and 52 to be five counts. The processor 40A predicts that the master timestamp counter 44A will have a value of forty at pulse 54" (Chapman [0026] lines 3-11).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to determine a longest observed delay between the source device and the destination device to determine the fixed transport delay value because “the timestamp counters 44 are used for counting an amount of time between synchronization pulses 14 and generating a local clock 46” (Chapman [0025] lines 4-6).

Regarding claim **9**, Myles, Yonge, Chapman discloses everything claimed as applied above (see claim 1). In addition, Myles discloses the limitation, transmitting the MAC packet toward the destination device (“the transmit HW 316 transmits the beacon” [0087] lines 4-5).

Regarding claim **10**, Myles, Yonge, Chapman discloses everything claimed as applied above (see claim 1). In addition, Myles discloses the limitation, the source device is a wireless local area network communications device (“wireless communication node 200 for use in a wireless network”, fig. 2), and wherein producing the MAC packet is performed by a medium access control device of the source device (STA MAC Administrator 302, fig. 6).

Regarding claim **11**, Myles discloses a method (figs. 3-8).

The limitation, calculating a transport delay experienced by a medium access control (MAC) packet due to a variable delay between a source device and a destination device (“calculating an offset to the free-running clock using the extracted synchronization information and the local timestamp, the calculating in non real-time, such that the sum of the calculated offset and the value of the free-running clock provides a local clock value that is approximately synchronized in time” [0011] lines 12-

Art Unit: 2416

17), wherein the MAC packet (MPDU, fig. 4a) includes a source MAC-layer timestamp (TSFbeaconout, fig. 4b), a source application-layer timestamp (TSFlocalout, fig. 4b), and source data (data, fig. 4b), and the transport delay is calculated based on the source MAC-layer timestamp and a destination MAC-layer timestamp generated based on a substantially synchronized clock between the source device and the destination device (“Synchronization between TSFs in STAs and APs is achieved using time synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp” [0036] lines 5-8).

The limitation, a destination application using the transport delay and the source application-layer timestamp to perform an application clock recovery process (“a local free-running clock includes the STA receiving a packet that contains synchronization information, for example in a beacon packet having a timestamp field, and generating a local timestamp by taking a copy (in hardware) of the local free-running clock at a known receive reference point during reception of the packet” [0041] lines 2-7).

The limitation, generating a destination MAC-layer timestamp (TSFbeaconin, fig. 4a), which indicates an approximate time when the source data is ready to be provided to a destination application.

The limitation, the destination MAC-layer timestamp is based on the substantially synchronized clock (“Synchronization between TSFs in STAs and APs is achieved using time synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp” [0036] lines 5-8).

The limitation, the destination MAC-layer timestamp and the MAC-layer timestamp are used in calculating the transport delay (“calculating an offset to the free-running clock using the extracted synchronization information and the local timestamp, the calculating in non real-time, such that the sum of the calculated offset and the value of the free-running clock provides a local clock value that is approximately synchronized in time” [0011] lines 12-17).

The limitation, establishing a fixed transport delay value ( $T_{offsetin}$  or  $T_{offsetout}$ ) for the destination device to use to schedule delivery of the source data to a destination application (table 1 or table 2).

The limitation, delaying delivery of the MAC packet to the destination application by a retiming delay, which is approximately equal to the fixed transport delay value minus the transport delay (“The adjustment  $T_{offset}$  is updated using a beacon received from the station’s own AP in the BSS.  $T_{offset}$  is updated to the sum of the beacon time  $TSF_{beaconin}$ , less the sum of the copied clock  $TSF_{localin}$  and the adjustment  $T_{offsetin}$ ” [0078] lines 2-6 and “the offset is recalculated every time a beacon is received, and in the case that the STA is in an IBSS, the offset is recalculated if the local synchronized time lags the received synchronized time” [0042] lines 12-15).

However, Myles fails to specifically disclose a source application-layer timestamp, a substantially synchronized clock between the source device and the destination device, a destination MAC-layer timestamp generation element, which generates a destination MAC-layer timestamp that indicates an approximate time when the source data will be provided to a destination application, the destination MAC-layer

Art Unit: 2416

timestamp is based on the substantially synchronized clock, determining a longest observed delay between the source device and the destination device to determine the fixed transport delay value.

Nevertheless, Yonge teaches “The MSDU format 100 also provides support for the layer of the network architecture 50 that is higher than the MAC layer 54 to control when a delivery time stamp has to be inserted” (Yonge [0059]), “The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the transmitter MAC 12, thus enabling jitter free service” (Yonge [0091] lines 9-13), “The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the transmitter MAC 12, thus enabling jitter free service” (Yonge [0091] lines 9-13) and “the Delivery time stamp 156 in the Sub-Frames 150 to determine when the corresponding MSDU 71 has to be delivered to the higher layer at the receiver. Synchronization of the clocks of the transmitters (e.g., MAC 12) and receivers (e.g., MAC 14) is obtained by transmitters inserting its local clock time stamp in MPDU header 258 and receiver using this to synchronize with the transmitter” (Yonge [0129] lines 3-10).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have a source application-layer timestamp, a substantially synchronized clock between the source device and the destination device, a destination MAC-layer timestamp generation element, which generates a destination MAC-layer timestamp that indicates an approximate time when the source data will be

Art Unit: 2416

provided to a destination application, the destination MAC-layer timestamp is based on the substantially synchronized clock because it will "provide support to enhance Quality of Service (QoS) support and efficient delivery of management information" (Yonge [0009] lines 4-6).

In addition, Myles and Yonge discloses everything claimed as applied above. However, Myles and Yonge fails to specifically disclose the limitation, determining a longest observed delay between the source device and the destination device to determine the fixed transport delay value.

Nevertheless, Chapman teaches "the master timestamp counter 44A in the master TSC 18A has a particular timestamp value at pulse 50 of synchronization pulses 14. In this example, the timestamp counter value is thirty. At a next pulse 52, the value of master timestamp counter 44A is thirty five. The processor 40A in master TSC 18A calculates the period T between pulses 50 and 52 to be five counts. The processor 40A predicts that the master timestamp counter 44A will have a value of forty at pulse 54" (Chapman [0026] lines 3-11).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to determine a longest observed delay between the source device and the destination device to determine the fixed transport delay value because "the timestamp counters 44 are used for counting an amount of time between synchronization pulses 14 and generating a local clock 46" (Chapman [0025] lines 4-6).

Regarding claim **18**, Myles, Yonge, Chapman discloses everything claimed as applied above (see claim 11). In addition, Myles discloses the limitation, providing

Art Unit: 2416

access to the substantially synchronized clock to the destination application, to enable the destination application to calculate the transport delay and to perform a clock recovery process ("a local free-running clock includes the STA receiving a packet that contains synchronization information, for example in a beacon packet having a timestamp field, and generating a local timestamp by taking a copy (in hardware) of the local free-running clock at a known receive reference point during reception of the packet" [0041] lines 2-7 and "The adjustment Toffset is updated using a beacon received from the station's own AP in the BSS. Toffset is updated to the sum of the beacon time TSFbeaconin, less the sum of the copied clock TSFlocalin and the adjustment Toffsetin" [0078] lines 2-6).

Regarding claim **19**, Myles, Yonge, Chapman discloses everything claimed as applied above (see claim 11). In addition, Myles discloses the limitation, the destination device is a wireless local area network communications device ("wireless communication node 200 for use in a wireless network", fig. 2), and wherein calculating the transport delay is performed by a medium access control element of the destination device (STA MAC Administrator 302, fig. 5).

2. Claims 20, 23, 26-28, 31-33, 37, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Myles in view of Yonge.

Regarding claim **20**, Myles discloses a method (figs. 5-7).

The limitation, producing, by a source device (AP 105, fig. 1c), a medium access control (MAC) packet (MPDU, fig. 4b) that includes a source application-layer timestamp (TSFlocalout, fig. 4b), source data (data, fig. 4b), and a source MAC-layer

Art Unit: 2416

timestamp (TSFbeaconout, fig. 4b), wherein the source MAC-layer timestamp is based on a substantially synchronized clock between the source device and a destination device (“Synchronization between TSFs in STAs and APs is achieved using time synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp” [0036] lines 5-8), and the source MAC-layer timestamp indicates a time when the source data is provided for transmission across a portion of a system that is subject to variable delays (“The MAC transmit HW 316 causes the beacon denoted Beacon(TSFbeaconout) with this timestamp TSFbeaconout to be transmitted by the PHY” [0085]).

The limitation, transmitting the MAC packet from the source device to the destination device (“the transmit HW 316 transmits the beacon” [0087] lines 4-5).

The limitation, calculating, by the destination device, a transport delay applied to the MAC packet based on the source MAC-layer timestamp and a destination MAC-layer timestamp generated based on the substantially synchronized clock (“calculating an offset to the free-running clock using the extracted synchronization information and the local timestamp, the calculating in non real-time, such that the sum of the calculated offset and the value of the free-running clock provides a local clock value that is approximately synchronized in time” [0011] lines 12-17).

The limitation, establishing a fixed transport delay value (Toffsetin or Toffsetout) for the destination device to use to schedule delivery of the source data to a destination application (table 1 or table 2).

The limitation, the destination device delaying delivery of the MAC packet to the destination application by a retiming delay, which is approximately equal to the fixed transport delay value minus the transport delay (“The adjustment Toffset is updated using a beacon received from the station’s own AP in the BSS. Toffset is updated to the sum of the beacon time TSFbeaconin, less the sum of the copied clock TSFlocalin and the adjustment Toffsetin” [0078] lines 2-6 and “the offset is recalculated every time a beacon is received, and in the case that the STA is in an IBSS, the offset is recalculated if the local synchronized time lags the received synchronized time” [0042] lines 12-15).

The limitation, generating a destination MAC-layer timestamp (TSFbeaconin, fig. 4a), which indicates an approximate time when the source data will be provided to a destination application.

The limitation, the destination MAC-layer timestamp is based on the substantially synchronized clock (“Synchronization between TSFs in STAs and APs is achieved using time synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp” [0036] lines 5-8).

The limitation, the destination MAC-layer timestamp and the MAC-layer timestamp are used in calculating the transport delay (“calculating an offset to the free-running clock using the extracted synchronization information and the local timestamp, the calculating in non real-time, such that the sum of the calculated offset and the value

Art Unit: 2416

of the free-running clock provides a local clock value that is approximately synchronized in time" [0011] lines 12-17).

However, Myles fails to specifically disclose a source application-layer timestamp, the source MAC-layer timestamp is based on a substantially synchronized clock between the source device and a destination device and the source MAC-layer timestamp and a destination MAC-layer timestamp generated based on the substantially synchronized clock, a destination MAC-layer timestamp generation element, which generates a destination MAC-layer timestamp that indicates an approximate time when the source data will be provided to a destination application and the destination MAC-layer timestamp is based on the substantially synchronized clock.

Nevertheless, Yonge teaches "The MSDU format 100 also provides support for the layer of the network architecture 50 that is higher than the MAC layer 54 to control when a delivery time stamp has to be inserted" (Yonge [0059]), "The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the transmitter MAC 12, thus enabling jitter free service" (Yonge [0091] lines 9-13), "the Delivery time stamp 156 in the Sub-Frames 150 to determine when the corresponding MSDU 71 has to be delivered to the higher layer at the receiver. Synchronization of the clocks of the transmitters (e.g., MAC 12) and receivers (e.g., MAC 14) is obtained by transmitters inserting its local clock time stamp in MPDU header 258 and receiver using this to synchronize with the transmitter" (Yonge [0129] lines 3-10), "The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the

Art Unit: 2416

transmitter MAC 12, thus enabling jitter free service" (Yonge [0091] lines 9-13) and "the Delivery time stamp 156 in the Sub-Frames 150 to determine when the corresponding MSDU 71 has to be delivered to the higher layer at the receiver. Synchronization of the clocks of the transmitters (e.g., MAC 12) and receivers (e.g., MAC 14) is obtained by transmitters inserting its local clock time stamp in MPDU header 258 and receiver using this to synchronize with the transmitter" (Yonge [0129] lines 3-10).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have a source application-layer timestamp, the source MAC-layer timestamp is based on a substantially synchronized clock between the source device and a destination device and the source MAC-layer timestamp and a destination MAC-layer timestamp generated based on the substantially synchronized clock, a destination MAC-layer timestamp generation element, which generates a destination MAC-layer timestamp that indicates an approximate time when the source data will be provided to a destination application and the destination MAC-layer timestamp is based on the substantially synchronized clock because it will "provide support to enhance Quality of Service (QoS) support and efficient delivery of management information" (Yonge [0009] lines 4-6).

Regarding claims **23 and 33**, Myles discloses an apparatus (figs. 3-8).

The limitation, a medium access control (MAC) packet production element (MPDU, fig. 4b), which produces a MAC packet that includes a source application-layer timestamp (TSFlocalout, fig. 4b), source data (data, fig. 4b), and a source MAC-layer timestamp (TSFbeaconout, fig. 4b), wherein the source MAC-layer timestamp is based

Art Unit: 2416

on a substantially synchronized clock between a source device and a destination device (“Synchronization between TSFs in STAs and APs is achieved using time synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp” [0036] lines 5-8), and the source MAC-layer timestamp indicates a time when the source data is provided for transmission across a portion of a system that is subject to variable delays (“The MAC transmit HW 316 causes the beacon denoted Beacon(TSFbeaconout) with this timestamp TSFbeaconout to be transmitted by the PHY” [0085]).

The limitation, a clock that is capable of being used as the substantially synchronized clock (“an STA in an ad hoc network (IBSS) or an infrastructure network (BSS) receives packets containing time synchronization information, e.g., beacons, and synchronizes its local TSF timer to the network TSF using the time synchronization information in the received packet. The STA thus needs to determine the relationship between local TSF and the time synchronization information in the received packet” [0037] lines 1-8).

The limitation, a source application interface, which receives an application-layer packet from a source application (“receives data 324 from a data link (or higher) level interface of the wireless station” [0048] lines 8-10), wherein the application-layer packet includes the source application-layer timestamp (TSFlocalout, fig. 4b), the source data (data, fig. 4b), and the source MAC-layer timestamp (TSFbeaconout, fig. 4b).

However, Myles fails to specifically disclose a source application-layer timestamp and the source MAC-layer timestamp is based on a substantially synchronized clock between a source device and a destination device.

Nevertheless, Yong teaches "The MSDU format 100 also provides support for the layer of the network architecture 50 that is higher than the MAC layer 54 to control when a delivery time stamp has to be inserted" (Yong [0059]) and "The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the transmitter MAC 12, thus enabling jitter free service" (Yong [0091] lines 9-13).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have a source application-layer timestamp and the source MAC-layer timestamp be based on a substantially synchronized clock between a source device and a destination device because it will "provide support to enhance Quality of Service (QoS) support and efficient delivery of management information" (Yonge [0009] lines 4-6).

Regarding claim **26**, Myles and Yonge discloses everything claimed as applied above (see claim 23). In addition, Myles discloses the limitation, a clock interface, which enables the substantially synchronized clock to be provided to a source application ("a local free-running clock includes the STA receiving a packet that contains synchronization information, for example in a beacon packet having a timestamp field, and generating a local timestamp by taking a copy (in hardware) of the local free-

Art Unit: 2416

running clock at a known receive reference point during reception of the packet" [0041] lines 2-7).

Regarding claim **27**, Myles and Yonge discloses everything claimed as applied above (see claim 23). In addition, Myles discloses the limitation, the apparatus forms a portion of a wireless local area network device ("wireless communication node 200 for use in a wireless network" [0032] lines 1-2 and fig. 2).

The limitation, an antenna for transmitting the MAC packet over a device-to-device communication link ("at least one antenna 202 for 5G Hz carrier service ... and a wireless transceiver 205" [0032] lines 6-8 fig. 2).

Regarding claims **28 and 37**, Myles discloses an apparatus (figs. 3-8).

The limitation, a transport delay calculation element, which calculates a transport delay applied to a medium access control (MAC) packet ("calculating an offset to the free-running clock using the extracted synchronization information and the local timestamp, the calculating in non real-time, such that the sum of the calculated offset and the value of the free-running clock provides a local clock value that is approximately synchronized in time" [0011] lines 12-17), wherein the MAC packet (MPDU, fig. 4a) includes a source MAC-layer timestamp (TSFbeaconout, fig. 4b), a source application-layer timestamp (TSFlocalout, fig. 4b), and source data (data, fig. 4b), and the transport delay is calculated based on the source MAC-layer timestamp and a substantially synchronized clock between the source device and the destination device ("Synchronization between TSFs in STAs and APs is achieved using time

Art Unit: 2416

synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp” [0036] lines 5-8).

The limitation, a clock that is capable of being used as the substantially synchronized clock (“an STA in an ad hoc network (IBSS) or an infrastructure network (BSS) receives packets containing time synchronization information, e.g., beacons, and synchronizes its local TSF timer to the network TSF using the time synchronization information in the received packet. The STA thus needs to determine the relationship between local TSF and the time synchronization information in the received packet” [0037] lines 1-8).

However, Myles fails to specifically disclose a source application-layer timestamp and a substantially synchronized clock between the source device and the destination device.

Nevertheless, Yonge teaches “The MSDU format 100 also provides support for the layer of the network architecture 50 that is higher than the MAC layer 54 to control when a delivery time stamp has to be inserted” (Yonge [0059]) and “The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the transmitter MAC 12, thus enabling jitter free service” (Yonge [0091] lines 9-13).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have a source application-layer timestamp and a substantially synchronized clock between the source device and the destination device

Art Unit: 2416

because it will "provide support to enhance Quality of Service (QoS) support and efficient delivery of management information" (Yonge [0009] lines 4-6).

The limitation, a destination MAC-layer timestamp generation element, which generates a destination MAC-layer timestamp (TSFbeaconin, fig. 4a) that indicates an approximate time when the source data will be provided to a destination application.

The limitation, the destination MAC-layer timestamp is based on the substantially synchronized clock ("Synchronization between TSFs in STAs and APs is achieved using time synchronization information in packets that contain time synchronization information, e.g., using beacon packets that each includes a timestamp" [0036] lines 5-8).

The limitation, the destination MAC-layer timestamp and the MAC-layer timestamp are used in calculating the transport delay ("calculating an offset to the free-running clock using the extracted synchronization information and the local timestamp, the calculating in non real-time, such that the sum of the calculated offset and the value of the free-running clock provides a local clock value that is approximately synchronized in time" [0011] lines 12-17).

The limitation, a fixed transport delay element, which delays delivery of the source data to a destination application by a retiming delay that is approximately equal to a fixed transport delay value minus the transport delay ("The adjustment Toffset is updated using a beacon received from the station's own AP in the BSS. Toffset is updated to the sum of the beacon time TSFbeaconin, less the sum of the copied clock TSFlocalin and the adjustment Toffsetin" [0078] lines 2-6 and "the offset is recalculated

Art Unit: 2416

every time a beacon is received, and in the case that the STA is in an IBSS, the offset is recalculated if the local synchronized time lags the received synchronized time" [0042] lines 12-15).

However, Myles fails to specifically disclose a destination MAC-layer timestamp generation element, which generates a destination MAC-layer timestamp that indicates an approximate time when the source data will be provided to a destination application and the destination MAC-layer timestamp is based on the substantially synchronized clock.

Nevertheless, Yonge teaches "The MPDU header 258 carries local clock time stamp information. This time stamp can be used by the receiver MAC (e.g., 14) to synchronize with the transmitter MAC 12, thus enabling jitter free service" (Yonge [0091] lines 9-13) and "the Delivery time stamp 156 in the Sub-Frames 150 to determine when the corresponding MSDU 71 has to be delivered to the higher layer at the receiver. Synchronization of the clocks of the transmitters (e.g., MAC 12) and receivers (e.g., MAC 14) is obtained by transmitters inserting its local clock time stamp in MPDU header 258 and receiver using this to synchronize with the transmitter" (Yonge [0129] lines 3-10).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have a destination MAC-layer timestamp generation element, which generates a destination MAC-layer timestamp that indicates an approximate time when the source data will be provided to a destination application and the destination MAC-layer timestamp is based on the substantially synchronized

Art Unit: 2416

clock because it will "provide support to enhance Quality of Service (QoS) support and efficient delivery of management information" (Yonge [0009] lines 4-6).

Regarding claim **31**, Myles and Yonge discloses everything claimed as applied above (see claim 28). In addition, Myles discloses the limitation, a clock interface, which enables the substantially synchronized clock to be provided to a destination application ("a local free-running clock includes the STA receiving a packet that contains synchronization information, for example in a beacon packet having a timestamp field, and generating a local timestamp by taking a copy (in hardware) of the local free-running clock at a known receive reference point during reception of the packet" [0041] lines 2-7).

Regarding claim **32**, Myles and Yonge discloses everything claimed as applied above (see claim 28). In addition, Myles discloses the limitation, the apparatus forms a portion of a wireless local area network device ("wireless communication node 200 for use in a wireless network" [0032] lines 1-2 and fig. 2).

The limitation, an antenna for receiving the MAC packet over an air interface ("at least one antenna 202 for 5G Hz carrier service ... and a wireless transceiver 205" [0032] lines 6-8 fig. 2).

Regarding claim **40**, Myles and Yonge discloses everything claimed as applied above (see claim 37). In addition, Myles discloses the limitation, providing access to the substantially synchronized clock to the destination application, to enable the destination application to calculate the transport delay and to perform a clock recovery process ("a local free-running clock includes the STA receiving a packet that contains

Art Unit: 2416

synchronization information, for example in a beacon packet having a timestamp field, and generating a local timestamp by taking a copy (in hardware) of the local free-running clock at a known receive reference point during reception of the packet” [0041] lines 2-7 and “The adjustment Toffset is updated using a beacon received from the station’s own AP in the BSS. Toffset is updated to the sum of the beacon time TSFbeaconin, less the sum of the copied clock TSFlocalin and the adjustment Toffsetin” [0078] lines 2-6).

### ***Response to Arguments***

Previous minor informality objections to claims 1, 5, 11, 13, 18, 20, 22, 23, 26, 28, 29, 31, 33, 36, 37, 38, 40 are withdrawn in view of Applicant’s amendment and arguments.

3. Applicant’s arguments have been fully considered but they are not persuasive.

In response to Applicant’s argument regarding claim 1 that no language could be found in Yonge to disclose that the layer 52 of network architecture 50 that is higher than MAC layer 54 contains source applications, the examiner respectfully disagrees. Yonge discloses “a protocol provides a communication service that higher-level objects (such as application processes, or higher-level layers) use to exchange messages” ([0041]), “The salient features of the MSDU format 100 include support for multiple higher layers of the network architecture to interface with the MAC layer 54” ([0056]), “The jitter control mechanism also includes support for higher layers of the network architecture to control the insertion of Delivery time stamps” ([0130]). This shows that source applications interface with the MAC layer. Therefore, Yonge discloses the layer

Art Unit: 2416

52 of network architecture 50 that is higher than MAC layer 54 contains source applications.

In response to Applicant's argument regarding claim 1 that Yonge discloses only a single timestamp (DTS) in a MAC packet, the examiner respectfully disagrees. Yonge discloses a delivery time stamp and a local clock time stamp. Yonge discloses "This mechanism uses the Delivery time stamp 156 in the Sub-Frames 150 to determine when the corresponding MSDU 71 has to be delivered to the higher layer at the receiver. Synchronization of the clocks of the transmitters (e.g., MAC 12) and receivers (e.g., MAC 14) is obtained by transmitters inserting its local clock time stamp in MPDU header 258 and receiver using this to synchronize with the transmitter" ([0129]). Therefore, Yonge discloses two timestamps.

In response to Applicant's argument regarding claim 1 that Chapman fails to disclose determining a longest observed delay, the examiner respectfully disagrees. Chapman discloses "the master timestamp counter 44A in the master TSC 18A has a particular timestamp value at pulse 50 of synchronization pulses 14. In this example, the timestamp counter value is thirty. At a next pulse 52, the value of master timestamp counter 44A is thirty five. The processor 40A in master TSC 18A calculates the period T between pulses 50 and 52 to be five counts. The processor 40A predicts that the master timestamp counter 44A will have a value of forty at pulse 54" ([0026]). This shows that delays are observed and that out of the two measurements, a longest delay is observed in order to determine a delay value. Therefore, Chapman discloses determining a longest observed delay.

***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTINE DUONG whose telephone number is (571)270-1664. The examiner can normally be reached on Monday - Friday: 830 AM-6 PM EST with second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2416

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christine Duong/  
Examiner, Art Unit 2416  
10/07/2008

/Brenda Pham/

Primary Examiner, Art Unit 2416